Chapter 1
Introduction

This Preliminary Draft Environmental Impact Statement (PDEIS) has been prepared as part of the Shasta Lake Water Resources Investigation (SLWRI) to evaluate the potential environmental, cultural, and socioeconomic effects of implementing the proposed action to modify the existing Shasta Dam and Reservoir. The SLWRI is led by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), Mid-Pacific Region, and includes this PDEIS and the accompanying Draft of the *Shasta Lake Water Resources Investigation Feasibility Report* (Feasibility Report) and appendices. Reclamation is serving as the Federal lead agency for compliance with the National Environmental Policy Act (NEPA). Under NEPA, a cooperating agency is any Federal agency, other than the lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in an action requiring an environmental impact statement (EIS). Cooperating agencies for the SLWRI, pursuant to NEPA, are U.S. Forest Service (USFS), Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians, U.S. Army Corps of Engineers, and U.S. Department of the Interior, Bureau of Indian Affairs. This document has also been prepared in accordance with the California Environmental Quality Act (CEQA) and may be used by State of California (State) permitting agencies that would be involved in reviewing and approving the project.

In conducting the SLWRI, Reclamation determined that expanding the capacity of Shasta Lake by modifying Shasta Dam would (1) increase survival of anadromous fish in the Sacramento River, and (2) improve water supply reliability for agricultural, municipal and industrial (M&I), and environmental water users; these are the two primary purposes of the SLWRI. In addition, implementing the proposed action would address other related resource needs.

1.1 Background

Reclamation was established in 1902 to assist in meeting the increasing water demands of the West. Today, Reclamation is the largest water provider in the country and the second largest producer of hydroelectric power in the western United States. Reclamation's Mid-Pacific Region is responsible for managing the Central Valley Project (CVP), which stores and delivers about 20 percent of the State's developed water — 7 million acre-feet (MAF) — to more than 250 water contractors throughout California.

Shasta Dam and Shasta Lake were constructed from September 1938 to June 1945. Shasta Dam was fully operable in April 1949, following World War II. During this period (circa 1945 – 1949), approximately 37 miles of the Union Pacific Railroad main line and 21 miles of U.S. Highway 99 (now Interstate 5 (I-5)) were relocated around the reservoir. Reclamation currently operates Shasta Dam and Shasta Lake in conjunction with other facilities to manage floodwater, irrigation water supply, M&I water supply, hydropower generation, and maintenance of navigation flows. The Central Valley Project Improvement Act (CVPIA) added "fish and wildlife mitigation, protection, and restoration" as a priority equal to water supply, and added "fish and wildlife enhancement" as a priority equal to hydropower generation.

1.1.1 SLWRI Authorization

Public Law 96-375 (October 3, 1980) provides feasibility study authority for the SLWRI and allows the Secretary of the Interior to do the following:

> *…engage in feasibility studies relating to enlarging Shasta Dam and Reservoir, Central Valley Project, California or to the construction of a larger dam on the Sacramento River, California, to replace the present structure.*

Section 103(c), "Authorizations for Federal Activities Under Applicable Law," of the CALFED Bay-Delta Authorization Act (Public Law 108-361, October 25, 2004), authorizes the Secretary of the Interior to carry out the activities described in paragraphs (1) through (10) of Subsection (d), which include the following:

> *...(1)(A)(i) planning and feasibility studies for projects to be pursued with project-specific study for enlargement of (1) the Shasta Dam in Shasta County.*

Also, Section 103(a)(1) of Public Law 108-361 (October 25, 2004) states the following:

> *The Record of Decision is approved as a general framework for addressing the CALFED Bay-Delta Program, including its components relating to water storage, ecosystem restoration, water supply reliability (including new firm yield), conveyance, water use efficiency, water quality, water transfers, watersheds, the Environmental Water Account, levee stability, governance, and science.*

The CALFED Bay-Delta Program (CALFED) Programmatic Record of Decision (ROD) (CALFED 2000a) called for the Secretary of the Interior to do the following:

> *…engage in feasibility studies for the purpose of determining the potential costs, benefits, environmental impacts, and feasibility of using the Sacramento River for conveying water from the enlarged Shasta Dam and Reservoir or the larger dam to points of use downstream from the dam.*

Other Federal legislation influences the SLWRI. Two laws of special note are Public Law 89-336 (November 8, 1965) and Public Law 102-575 (October 30, 1992). Public Law 89-336 created the Whiskeytown-Shasta-Trinity National Recreation Area, which includes Shasta Dam and Reservoir. Public Law 102-575, the CVPIA, directed numerous changes to operation of the CVP. Among these changes was adding fish and wildlife protection, restoration, and enhancement as a project purpose, which resulted in substantial changes to water supply deliveries, river flows, and related environmental conditions in the study area. To minimize impacts to CVP water contractors, the CVPIA also directed the Secretary of the Interior to develop a least-cost plan to increase the yield of the CVP by the amount dedicated to fish and wildlife purposes.

1.1.2 Major Previous Studies and Reports

Major previous Reclamation studies and reports investigating potential enlargement of Shasta Dam and Reservoir include the *Enlarged Shasta Lake Investigation Preliminary Findings Report* (1983), *Shasta Dam and Reservoir Enlargement, Appraisal Assessment of the Potential for Enlarging Shasta Dam and Reservoir* (1999), *Strategic Agency and Public Involvement Plan* (2003), *Mission Statement Milestone Report* (2003), *Initial Alternatives Information Report* (2004), *Environmental Scoping Report* (2006), and *Plan Formulation Report* (2007).

1.2 Purpose and Need for Proposed Action and Project Objectives

NEPA regulations require a statement of "the underlying purpose and need to which the agency is responding in proposing the alternatives, including the proposed action" (40 Code of Federal Regulations 1502.13), described in Section 1.2.1. The State CEQA Guidelines require a clearly written statement of objectives, including the underlying purpose of a project (Section 15124(b)), described in Section 1.2.2.

1.2.1 Purpose and Need for Proposed Action

The purpose of the proposed action is to improve operational flexibility of the Sacramento-San Joaquin Delta (Delta) watershed system through modifying the existing Shasta Dam and Reservoir to increase water supply reliability and anadromous fish populations in the upper Sacramento River. Specifically, the purpose of the proposed action is to accomplish all of the following:

- Promote increased survival of anadromous fish populations in the upper Sacramento River, primarily upstream from the location of the Red Bluff Diversion Dam (RBDD).

- Increase water supplies and water supply reliability for agricultural, M&I, and environmental purposes to help meet current and future water demands.

- To the extent possible, through meeting these objectives, include features that conserve and restore ecosystem resources in the Shasta Lake area and along the upper Sacramento River, reduce flood damage along the Sacramento River, increase hydropower capabilities at Shasta Dam, maintain and increase recreation opportunities at Shasta Lake, and maintain or improve water quality conditions in the Sacramento River downstream from Shasta Dam and in the Delta.

The need for the proposed action is described below and summarized from the 2007 Reclamation *Shasta Lake Water Resources Investigation Plan Formulation Report*, the 2004 Reclamation *Shasta Lake Water Resources Investigation Initial Alternatives Information Report*, and the Plan Formulation Appendix.

Anadromous Fish Survival

The Sacramento River system is unique in California in that it supports four separate runs of Chinook salmon: fall-, late fall-, winter-, and spring-run. The adult populations of the four runs of salmon and other important fish species that spawn in the upper Sacramento River have considerably declined over the last 40 years (DFG 2010). Several fish species in the upper Sacramento River have been listed under the Federal Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered), Central Valley spring-run Chinook salmon (threatened), Central Valley steelhead (threatened), and the Southern Distinct Population Segment of North American green sturgeon (threatened). Two of these species are also listed under the California Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered) and Central Valley spring-run Chinook salmon (threatened).

Unsuitable water temperatures in the upper Sacramento River, especially in dry and critically dry years, is a critical factor affecting the abundance of Chinook salmon and steelhead in the river. Releases of cold water stored behind Shasta Dam can improve seasonal water temperatures in the Sacramento River for anadromous fish, particularly winter-run Chinook salmon, during critical periods. Prolonged droughts depleting the cold-water storage in Shasta Reservoir could extirpate the entire Sacramento River winter-run Chinook salmon population (NMFS 2009a). Under current conditions, even 2 consecutive years of drought could reduce Shasta Reservoir cold-water storage to levels insufficient to support the Sacramento River winter-run Chinook spawning and incubation season. This could result in complete year-class

failure, virtually eliminating all of a single year's spawning and incubating winter-run Chinook in the Sacramento River (NMFS 2009a).

Various Federal, State, and local projects are addressing factors contributing to declines in anadromous fish populations. Recovery actions range from changing the timing and magnitude of reservoir releases to changing the temperature of released water. In May 1990, the State Water Resources Control Board issued Order 90-5, which included temperature objectives for the Sacramento River to protect winter-run Chinook salmon. The 1993 and 2004 National Marine Fisheries Service (NMFS) Biological Opinions (BO) for Sacramento River winter-run Chinook salmon reinforced this order and established certain operating parameters for Shasta Reservoir. The State Water Resources Control Board action and the NMFS BOs set surrogate or minimum flows in the river downstream from Keswick Dam primarily to affect water temperatures during key periods. In addition to flow requirements, structural changes have been made at Shasta Dam to change the temperature of released water, such as construction of the temperature control device, which was completed in 1997.

However, implementing requirements in the Trinity River ROD (as amended) may reduce water temperature improvements provided by the temperature control device at Shasta Dam. One of the major elements of the Trinity River ROD is reducing the average annual export of Trinity River water from 74 percent to 52 percent of the flow (Reclamation 2000). This reduces flow from the Trinity River basin into Keswick Reservoir, and then into the Sacramento River. Because water diverted from the Trinity River is generally cooler than flows released from Shasta Dam, implementing the Trinity River ROD offsets some of the benefits derived from the temperature control device.

Despite the efforts described above, a residual need remains for generally cooler water in the Sacramento River, especially in dry and critically dry water years. Additional actions are needed to continue reducing water temperatures in the Sacramento River at critical life stages of and improve habitat conditions for anadromous fish species.

Also, future effects of climate change on operations and conditions at Shasta Lake, and in the upper Sacramento River, could potentially result in changes to water temperature, flow, and ultimately, fish survival. Most importantly, it is expected that climate change may result in increased water temperatures downstream from Shasta Dam, particularly in summer months, and more frequent wet and drought (particularly extended drought) years. Increased water temperatures and extended drought periods may compound the threats to anadromous fish in the Sacramento River. Climate change could also result in reduced end-of-September carryover storage volumes, resulting in lower lake levels for a portion of the year, and a smaller cold-water pool, resulting in warmer water temperature and reduced water quality within Shasta Reservoir.

Water Supply Reliability

California's water supply system faces critical challenges with demands exceeding supplies for agricultural, M&I, and environmental water uses across the State. The 2009 California Department of Water Resources (DWR) *California Water Plan Update* concludes that California is facing one of the most significant water crises in its history; drought impacts are growing, ecosystems are declining, water quality is diminishing, and climate change is affecting statewide hydrology. Compounding these issues, Reclamation's *Water Supply and Yield Study* (2008a) describes dramatic increases in statewide population, land use changes, regulatory requirements, and limitations on storage and conveyance facilities, further straining available water supplies and infrastructure to meet water demands. Furthermore, projected unmet water demands are expected to increase competition for water supplies among agricultural, M&I, and environmental uses.

Projecting accurate and quantified water supply and shortages in California is complex; there are numerous variables and, just as important, numerous opinions regarding these variables. Reclamation's *Water Supply and Yield Study* (2008a) estimates current statewide water supply shortages at 2.3 MAF and 4.2 MAF for average and dry years, respectively. Without further investment in water management and infrastructure, future statewide shortages are expected to increase to approximately 4.9 MAF and 6.1 MAF in average and dry years, respectively, by 2030 (Reclamation 2008a). Representative demands for dry and average years were based on water use data from the 2005 *California Water Plan Update* (DWR), adjusted for population growth, increasing urban water use, and reductions in irrigated acreage and environmental flow due to insufficient water supplies.

A major factor in California's future water picture is population growth. California's population is expected to increase by just over 60 percent by 2050 (DOF 2010) and could force some of the existing water supplies currently identified for agricultural uses to be redirected to urban uses. Because some portion of increased population growth in the Central Valley would occur on lands currently used for irrigated agriculture, water that would have been needed for these lands for irrigation would instead be used to meet urban demands. However, this would only partially offset the required agricultural-to-urban water conversion needed to sustain projected urban water demands, since much of the growth would occur on nonirrigated agricultural lands. Even if all of the urban growth in the Central Valley would occur on lands currently under irrigation, this would only account for up to about 40 percent of expected future conversion needs, and additional agricultural-to-urban water conversion would be required to help sustain urban growth primarily in other areas of the State.

Another potentially significant factor affecting water supply reliability is climate change. Potential impacts due to climate change are many and complex (DWR 2006), varying through time and geographic location across the State (Reclamation 2011). Changes in geographic distribution, timing, and intensity

of precipitation are projected for the Central Valley (Reclamation 2011), which could broadly impact rainfall runoff relationships important for flood management and water supply. A reduction in total system storage is also anticipated as a result of climate change. Precipitation held in snowpack makes up a significant quantity of total annual supplies needed for urban, M&I, and many environmental uses. It is expected that in the future, climate change may significantly reduce water held in snowpack in the Sierra Nevada Mountains (DWR 2009). Additionally, when climate change is considered in projections of change in water demand, annual water demand is higher than under a repeat of historical climate (DWR 2009). During drought periods, expected supplies could be further reduced, and expected shortages would be significantly greater.

Also, CVP and State Water Project (SWP) flexibility has diminished with population growth and increased environmental and ecosystem commitments and requirements (Reclamation 2008a). For example, the CVPIA, implemented in 1993, dedicated 800 thousand acre-feet of CVP water supplies to the environment as well as additional water supplies for wildlife refuges. This had the greatest impact on dry year agricultural water deliveries, with CVP delivery capability for agricultural users, both north and south of the Delta, reduced by about 50 percent (Reclamation 2008a). Complicating this issue is the variability associated with water resources in California. Precipitation in California is seasonably, temporally, and spatially variable and agricultural, M&I, and environmental water users have variable needs for quantity, quality, timing, and place of use.

California's water systems face the threat of too much water during floods, and too little water to meet demands during dry and critical water years. Chronic water shortages have led to increases in groundwater usage, which has led to groundwater overdraft in many regions across the State. Groundwater overdraft can cause permanent declines in groundwater levels, long-term reductions in groundwater supplies, land subsidence, decreases in water quality, a greater potential for salt water intrusion, and lasting environmental impacts. Challenges are greatest during drought years, when water supplies are less available (DWR 2009).

An integrated portfolio of solutions, regional and statewide, is needed to meet future water supply needs. Even with major efforts by multiple agencies to address the complex water resources issues in the State, demands are expected to exceed supplies in the future. The 2008 *Water Supply and Yield Study* (Reclamation) stated that a "variety of storage and conveyance projects and water management actions have the potential to help fill [the] gap" between water supply and demand in California. The *2009 California Water Plan Update* (DWR) concluded that California must invest in reliable, high-quality, and affordable water conservation, efficient water management, and development of water supplies to protect public health, and improve California's economy, environment, and standard of living. Water management flexibility and adaptability will become even more necessary in the future to

meet the challenges associated with increasing population, environmental needs, and climate change. Even so, to avoid major impacts to the economy, overall environment, and standard of living in California, actions to conserve existing supplies and optimize the use of existing facilities will be needed. Additionally, development of additional water sources and increased storage and delivery capability are critical for providing reliable water supplies for expanding M&I uses and to maintain adequate supplies for agricultural and environmental purposes.

Other Resources

Reclamation has identified other resource needs that could be addressed through modification of Shasta Dam and Reservoir. Escalating demands on statewide electricity production, continuing modification of natural aquatic and riparian habitats in the Sacramento River system, increasing threats of potential flooding in the Sacramento River system, and greater demands for recreational opportunities are all potential local, regional, or statewide problems exacerbated by California's population growth in general and particularly in the Sacramento Valley. The SLWRI provides opportunities to address these other resource needs, as well as the primary SLWRI objectives of increased anadromous fish survival and water supply reliability.

1.2.2 Project Objectives

To address the identified purpose and need described above, two primary project (i.e., planning) objectives were developed for the SLWRI. Five secondary project objectives were developed to take advantage of other beneficial project opportunities.

Primary Project Objectives

Primary project objectives are those which specific alternatives are formulated to address. Primary project objectives developed for the SLWRI are as follows:

- Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the RBDD.

- Increase water supply and water supply reliability for agricultural, M&I, and environmental purposes to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir.

The primary project objectives are considered to have coequal priority, with each pursued to the maximum practicable extent without adversely affecting the other.

Secondary Project Objectives

Secondary project objectives are actions, operations, or features that should be considered in the plan formulation process, but only to the extent possible through pursuit of the primary project objectives. Five secondary project objectives were developed for the SLWRI:

- Conserve, restore, and enhance ecosystem resources in the Shasta Lake area and along the upper Sacramento River
- Reduce flood damage along the Sacramento River
- Develop additional hydropower generation capabilities at Shasta Dam
- Maintain and increase recreation opportunities at Shasta Lake
- Maintain or improve water quality conditions in the Sacramento River downstream from Shasta Dam and in the Delta

1.3 Setting and Location

Shasta Dam and Shasta Lake are located on the upper Sacramento River in Northern California, approximately 9 miles northwest of Redding in Shasta County (Figure 1-1). The SLWRI includes both a primary and extended study area because of the potential influence of the proposed modification of Shasta Dam and Reservoir and subsequent system operations and water deliveries on resources over a large geographic area. The primary study area includes the following:

- Shasta Dam and Shasta Lake
- Lower reaches of three primary tributaries flowing into Shasta Lake (Sacramento, McCloud, and Pit rivers) and all smaller tributaries flowing into the lake
- Trinity and Lewiston Reservoirs
- Sacramento River between Shasta Dam and the RBDD facilities, including tributaries at their confluence

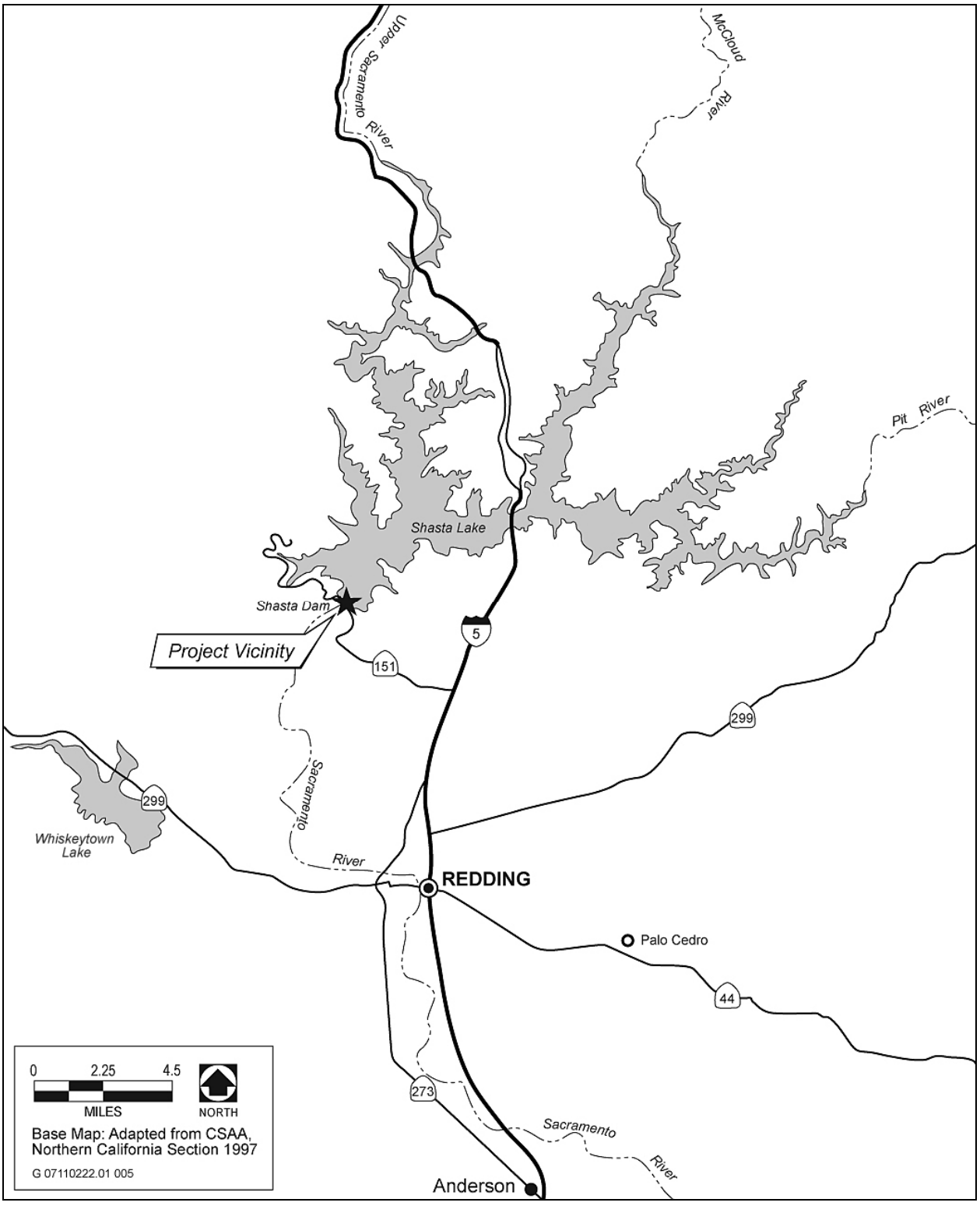

Figure 1-1. Shasta Dam and Shasta Lake Vicinity

The extended study area includes the following:

- Sacramento River downstream from the RBDD facilities, including portions of major tributaries, namely the American and Feather river basins downstream from CVP/SWP facilities
- Delta
- San Joaquin River basin at and downstream from CVP facilities (Friant and New Melones reservoirs)
- Facilities and water service areas of the CVP and SWP

The SLWRI study area includes other areas of California with resource programs or projects that could potentially be directly or indirectly influenced by modifying Shasta Dam and Reservoir. As discussed above, this area is represented by the Sacramento and San Joaquin rivers and the Delta system, plus the entirety of the CVP and SWP facilities and water service areas. For analyses of each resource that may be directly or indirectly affected by the project, this study area is subdivided into specific geographic areas, as described in the following sections.

1.3.1 Primary Study Area

The primary study area includes Shasta Dam and Reservoir, the lower portions of all contributing major and minor tributaries affected by increasing storage in Shasta Lake, and the Sacramento River downstream to the location of the RBDD. The RBDD is directly adjacent to the Red Bluff Pumping Plant (RBPP), which is currently under construction. Figure 1-2 shows the portion of the primary study area downstream from Shasta Dam.

Shasta Dam

Shasta Dam and Shasta Lake deliver about 55 percent of the total annual water supply used by the CVP. Shasta Dam is 602 feet tall (533 feet above the streambed). Upon construction, Shasta Dam was the second tallest and second largest concrete dam in the world. It was exceeded only by Hoover Dam (located in Clark County, Nevada) in height and by Grand Coulee Dam (located in Grant County, Washington) in volume and surface area (Reclamation 2004a).

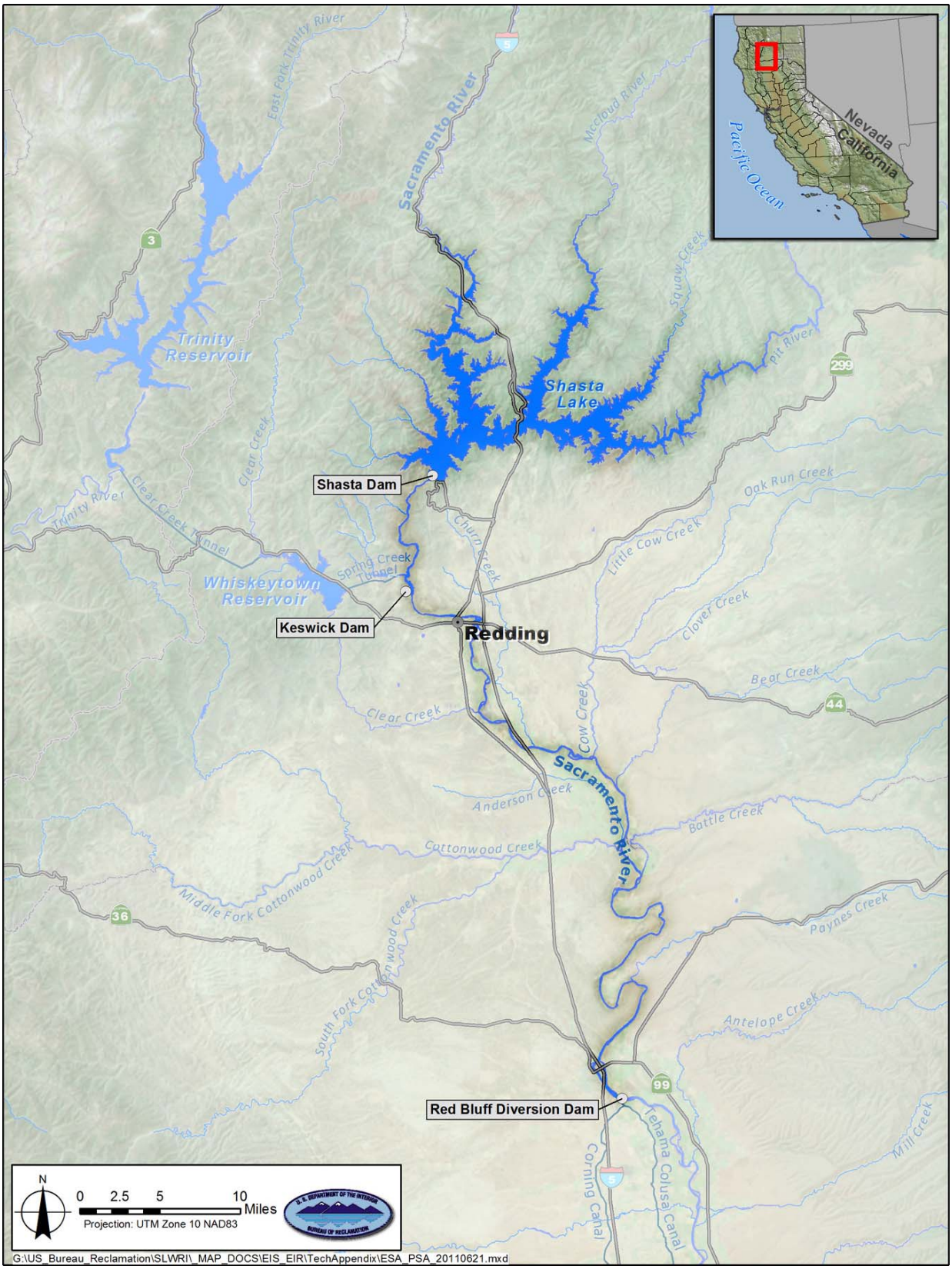

Figure 1-2. Primary Study Area – Shasta Lake Area and Sacramento River from Shasta Dam to Red Bluff Diversion Dam

Shasta Lake and Vicinity

Created by Shasta Dam, Shasta Lake is the largest reservoir in California with a surface area of approximately 29,500 acres, a volume of 4.55 MAF, and approximately 400 miles of shoreline. Offering a wide variety of water-based recreational opportunities, Shasta Lake is considered a premier lake for houseboating. Eleven resorts and numerous Shasta-Trinity National Forest campgrounds and boat ramps provide boating and fishing access; bank and boat fishing occurs year-round. Recreation at the reservoir is managed by the USFS consistent with the *Shasta-Trinity Land and Resource Management Plan* (USFS 1995) and guidelines established for the Whiskeytown-Shasta-Trinity National Recreation Area. Shasta Lake is also home to a wide variety of wildlife species, including resident bald eagles and osprey.

The reservoir's watershed receives a substantial amount of precipitation relative to the rest of California; only a limited region in the State's far northwest corner receives more. The three major tributaries to Shasta Lake are the Sacramento, McCloud, and Pit rivers. Many smaller tributary creeks and streams (both seasonal and perennial) flow into these major tributaries and the reservoir itself. The major tributaries are described in more detail below.

Sacramento River The Sacramento River drains an area of approximately 430 square miles. Its headwaters include portions of Mount Shasta and the Trinity and Klamath mountains. The Sacramento River flows south from its headwaters for about 40 miles before entering Shasta Lake.

McCloud River The McCloud River drains an area of approximately 600 square miles. Its headwaters are at Colby Meadows near Bartle, California. The McCloud River flows southwesterly from its headwaters for about 50 miles to its terminus at Shasta Lake.

Pit River The Pit River watershed is located in northeastern California and southeastern Oregon. The north and south forks of the Pit River drain the northern portion of the watershed. The North Fork Pit River originates at the outlet of Goose Lake, and the South Fork originates in the south Warner Mountains at Moon Lake in Lassen County. The Pit River is joined by the Fall River in Shasta County and has 21 named tributaries, totaling approximately 1,050 miles of perennial streams and encompassing approximately 4,700 square miles.

Trinity and Lewiston Reservoirs Trinity and Lewiston reservoirs impound the upper Trinity River approximately 60 and 67 miles, respectively, southwest of the headwaters near Mount Eddy (USFS 2005). Trinity Reservoir has a watershed of approximately 105,600 acres and a usable storage capacity of approximately 2,438,000 acre-feet. Flow into Lewiston Reservoir, with a capacity of approximately 14,700 acre-feet, is completely regulated by releases from Trinity Dam (USFS 2005). At Lewiston Dam, a portion of Trinity River

flows are diverted to the Sacramento River basin through the Clear Creek Tunnel.

Upper Sacramento River — Shasta Dam to Red Bluff Diversion Dam

This portion of the study area includes an approximately 65-mile-long stretch of the Sacramento River corridor from Shasta Dam to the RBDD facilities, including tributaries at their confluence. The Sacramento River corridor within this reach also includes Reading Island and areas proposed for gravel augmentation. Communities located along this stretch of the river are Redding, Anderson, and Red Bluff. The northern portion of this reach is located in Shasta County and the southern portion is in Tehama County.

Shasta Dam, Keswick Dam, Anderson-Cottonwood Irrigation District Dam, and the RBDD are located on the Sacramento River in this area. Urban, residential, industrial, and agricultural land uses predominate along the upper Sacramento River between Shasta Dam and the RBDD.

1.3.2 Extended Study Area

The extended study area for the project includes the RBDD south (downstream along the Sacramento River) to the Delta. It also includes the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta) area and portions of the American and Feather river basins, the San Joaquin River basin, and the CVP and SWP facilities and water service areas (Figure 1-3).

Sacramento River from Red Bluff Diversion Dam to Delta

The segment of the extended study area between the RBDD facilities and the Delta includes the Sacramento River, tributaries at their confluence, and portions of major tributaries that may be affected by the project, namely, the Feather and American rivers. The Yuba River is a major tributary to the Feather River, but the Yuba River is not considered part of this segment of the extended study area for two reasons: it is geographically separated from the Sacramento River, and its watershed has no CVP or SWP facilities that could be indirectly affected by increased storage at Shasta Lake. Lake Oroville is a major DWR SWP facility on the Feather River, and Folsom Lake is a major Reclamation CVP facility on the American River.

The reach of the middle Sacramento River between Red Bluff and Colusa is approximately 100 miles.

The Sacramento River Hydrologic Region, as defined by DWR, is the main water supply for much of California's urban and agricultural areas. Annual runoff averages about 22.4 MAF, which is nearly one-third of California's total runoff. M&I and agricultural supplies to the Sacramento Valley region are about 8 MAF, with groundwater providing approximately 2.5 MAF of that total. Much of the remainder of the runoff in the Sacramento River watershed goes to dedicated in-channel flows that support various environmental requirements, including instream flow and Delta salinity requirements (DWR 2003).

Figure 1-3. Central Valley Project and State Water Project Water Service Areas

Sacramento-San Joaquin Delta

Surface water resources in the Delta are influenced by the interaction of tributary inflows, tides, Delta hydrodynamics, local Delta diversions and exports, and water transfers. The Delta receives runoff from a watershed that includes more than 40 percent of California's land area and covers approximately 750,000 acres. Tributaries that discharge directly into the Delta include the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras rivers. Existing surface water conditions in the Delta are the result of the many changes that have occurred as the Delta and its watershed have been developed over the past 150 years.

Tides move water twice daily from San Francisco Bay into the Delta. The location of the mixing zone between freshwater from the Delta and saline water from the bay varies with the amount of Delta outflow and tides. Saltwater intrusion into the Delta during summer is controlled by tides, freshwater inflows from reservoir releases, and Delta pumping. Average incoming and outgoing Delta tidal flow is approximately 170,000 cubic feet per second and average net Delta outflow is about 30,000 cubic feet per second, or about 21 MAF per year, measured at Chipps Island.

San Joaquin River Basin to Delta

The San Joaquin River basin includes the Central Valley south of the Delta. This area is drier than the Sacramento Valley, and flows into the Delta from the San Joaquin River are considerably less than those from the Sacramento River. The river is also subject to extreme variations in flow and water quality.

The San Joaquin River watershed above Vernalis (the point at which the river enters the Delta) is 13,356 square miles. Inflows from the Merced (farthest upstream), Tuolumne, and Stanislaus rivers contribute more than 60 percent of the flows in the San Joaquin River, as measured at Vernalis.

The major rivers of the San Joaquin system have contributed an average of about 5.5 MAF to Delta inflow, with an annual range of 1.1 to 15 MAF. Historical unimpaired flows on the Stanislaus, Tuolumne, Merced, and San Joaquin rivers averaged a total of 5.6 MAF. Numerous dams, reservoirs, and diversions are located on these rivers and others in the San Joaquin system. New Melones Reservoir is located on the Stanislaus River and is part of Reclamation's CVP system.

Central Valley Project Facilities and Water Service Areas

The CVP supplies irrigation water to the Sacramento and San Joaquin valleys; domestic water to cities and industries in Sacramento County and the east and South San Francisco Bay area; and water to fish hatcheries and wildlife refuges throughout the Central Valley. The CVP delivers approximately 7 MAF of water per year. CVP facilities include 20 dams and reservoirs with a combined storage capacity of more than 11 MAF, 39 pumping plants, 2 pumping-generating plants, 11 powerplants, and more than 500 miles of major canals and

aqueducts. CVP divisions comprise Trinity River, Shasta Lake, Sacramento River, American River, Delta, West San Joaquin, San Felipe, East Side, and Friant.

The CVP has three primary storage facilities in Northern California: Shasta Dam and Shasta Lake, Trinity Dam and Clair Engle Lake, and Folsom Dam and Folsom Lake. Major storage facilities south of the Delta are New Melones Reservoir on the Stanislaus River, Millerton Lake on the San Joaquin River, and San Luis Reservoir, which is a pumped-storage reservoir on the west side of the San Joaquin Valley, and is shared with the SWP.

The Delta-Mendota Canal is the main conveyance facility of the CVP. This canal conveys water from the C. W. "Bill" Jones Pumping Plant (formerly known as the Tracy Pumping Plant) in the south Delta near Byron to agricultural lands in the San Joaquin Valley. Water not delivered directly is diverted from the Delta-Mendota Canal at the O'Neill Pumping Plant into O'Neill Forebay. The water then flows along the San Luis Canal to CVP contractors in the San Joaquin Valley or is lifted into San Luis Reservoir through the Gianelli Pumping/Generating Plant for later use. The majority of the remaining water continues to the southern Central Valley, with some water being diverted to Santa Clara County.

State Water Project Facilities and Water Service Areas

The SWP is the largest state-built, multipurpose water project in the country. DWR operates and maintains the SWP, which conveys an annual average of 2.5 MAF of water through 20 pumping plants, 4 pumping-generating plants, 5 hydroelectric powerhouses, 34 storage facilities, and about 701 miles of open canals and pipelines.

DWR operates the SWP to export Delta flows and store and transfer water from the Feather River basin to the San Joaquin Valley, South San Francisco Bay, areas north of Suisun Bay, coastal counties, and ultimately to Southern California. The State Legislature authorized the SWP in 1951 for water supply, flood control, hydropower generation, recreation, and fish and wildlife purposes. Approximately 25 million of California's estimated 37 million residents benefit from SWP water, which also irrigates about 750,000 acres of farmland, mainly in the south San Joaquin Valley. Of the contracted water supply, M&I users have received about half of the total water delivered over the last 20 years; the remainder is supplied for agricultural use. A total of 29 contracting agencies receive water from the SWP.

In the southern Delta, the SWP diverts water from Clifton Court Forebay for delivery south of the Delta. The Harvey O. Banks Pumping Plant lifts water from Clifton Court Forebay into Bethany Reservoir. The water delivered to Bethany Reservoir flows into the California Aqueduct, the main conveyance facility of the SWP. Along the western San Joaquin Valley, the California Aqueduct transports water through the Gianelli Pumping/Generating Plant for

storage in San Luis Reservoir until it is needed for later use. The 444-mile-long California Aqueduct conveys water to the agricultural lands of the San Joaquin Valley and the urban regions of Southern California. The west branch of the aqueduct ends in Castaic Lake, and the east branch terminates at Lake Perris in Southern California.

1.4 NEPA Requirements

NEPA is a planning process to inform stakeholders, public agencies, and decision makers of the significance of potential environmental effects that may result from taking an action or implementing a Federal action. These processes disclose the significance of the effects of a proposed action on the natural and human environment. The environmental effects of a range of reasonable alternatives, including a no-action alternative, are also analyzed as required under NEPA.

1.4.1 NEPA Process

Reclamation is the Federal lead agency for NEPA compliance (42 U.S. Code 4321 et seq.). Based on a review of technical data and the scope of the SLWRI, Reclamation determined that the proposed action would result in significant impacts and that an EIS is the appropriate NEPA document to be prepared. Consequently, this PDEIS has been made available for public review, and a Draft EIS, Final EIS, and ROD will be published subsequently.

The EIS, when finalized, will satisfy NEPA requirements for formulating and evaluating alternatives, disclosing environmental impacts, and indentifying potential mitigation measures. Section 1.5.2, “Intended Use of Final EIS,” describes the roles and responsibilities of Federal, State, and local agencies and includes a list of agencies that may use the EIS, when finalized, for NEPA compliance, or to inform decisions regarding resources within their jurisdictions.

1.5 Intended Use of EIS

This section described how this PDEIS will be used now and when it is finalized.

1.5.1 Intended Use of Preliminary Draft EIS

Release of this Preliminary Draft EIS, the Draft Feasibility Report, and their appendices presents SLWRI findings to date, and provides another opportunity for public and stakeholder input. When additional information and studies are incorporated into the SLWRI, Reclamation will distribute a formal Draft EIS for public review and comment.

1.5.2 Intended Use of Final EIS

An EIS identifies and evaluates alternatives that meet the project purpose and can also avoid project-related impacts, analyzes the environmental effects of an action, and indicates additional measures to reduce or avoid potential environmental effects resulting from the action alternatives (i.e., mitigation measures). An EIS must also disclose significant environmental effects that cannot be avoided, growth-inducing effects, significant cumulative impacts, and effects found not to be significant. The purpose of an EIS is not to recommend approval or rejection of a project, but to provide information to aid the public and decision makers/permitting agencies in the decision-making process.

This EIS, when finalized, is intended to be used by the Federal lead agency when considering approval of the proposed action or an alternative to the proposed action. All cooperating agencies, responsible agencies, and other Federal, State, and local agencies with permitting or approval authority over any aspect of the proposed action are expected to use the information contained in the Final SLWRI EIS to meet most, if not all, of their information needs to make decisions and/or issue permits with respect to the proposed action. Table 1-1 presents Federal, State, and local agencies that may use the EIS for their decision-making needs.

This PDEIS also serves as a companion document to the Draft Feasibility Report, published concurrently. The Draft Feasibility Report builds on the information contained in the *Shasta Lake Water Resources Investigation Plan Formulation Report* (Reclamation 2007) and incorporates information contained in the SLWRI PDEIS by reference. The Feasibility Report, when finalized, will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir.

Table 1-1. Agency Roles and Responsibilities

Agency	Role/Responsibility
Federal	
U.S. Army Corps of Engineers (cooperating agency)	Permitting under Section 404 of the Clean Water Act; Permitting under Sections 9, 10, and 13 of the Rivers and Harbors Act
U.S. Department of the Interior, Bureau of Indian Affairs (cooperating agency)	Participating in SLWRI feasibility study
U.S. Department of the Interior, Bureau of Land Management	Reviewing SLWRI studies for consistency of project facilities with management of the Sacramento River Bend Management Area
U.S. Department of the Interior, Bureau of Reclamation	Serving as NEPA lead agency
U.S. Fish and Wildlife Service	Completing Federal Endangered Species Act consultation and incidental take authorization; verifying compliance with the Fish and Wildlife Coordination Act
National Marine Fisheries Service	Completing Federal Endangered Species Act consultation and incidental take authorization; verifying compliance with the Magnuson-Stevens Act

Table 1-1. Agency Roles and Responsibilities (contd.)

Agency	Role/Responsibility
State	
U.S. Forest Service (cooperating agency)	Verifying consistency of project facilities with management of the Shasta-Trinity National Forest and Whiskeytown-Shasta-Trinity National Recreation Area; regulating occupancy and use of National Forest lands under the Federal Land Policy Management Act
U.S. Environmental Protection Agency	Reviewing effects on air quality for compliance with the Clean Air Act and State Implementation Plan; verifying compliance with the Safe Drinking Water Act; reviewing and filing EIS
California Air Resources Board	Verifying compliance with criteria pollutant standards
California Department of Boating and Waterways	Verifying compliance with the California Harbors and Navigation Code
California Department of Conservation	Designating Important Farmland for the State
California Department of Fish and Game (trustee agency)	Completing California Endangered Species Act consultation and incidental take authorization; permitting under Section 1602 of the Fish and Game Code (streambed alteration agreement); completing consultation as a trustee agency
California Department of Forestry and Fire Protection	Providing fire protection services to unincorporated areas
California Department of Parks and Recreation	Verifying consistency with management of State Park lands
California Department of Transportation	Issuing encroachment permit and/or approving transportation management plan
California Department of Water Resources	Operating the State Water Project; participating in the SLWRI feasibility study
California Department of Toxic Substances Control	Verifying compliance with regulations for generation, transportation, treatment, storage, and disposal of hazardous waste
California Energy Commission	Verifying compliance with State energy policies
California Highway Patrol	Verifying that the project would not interfere with any emergency response plan or emergency response times
California Resources Agency	Verifying that California's natural and cultural resources are protected
Central Valley Flood Protection Board (formerly The Reclamation Board)	Issuing levee and floodway encroachment permits
California Office of Historic Preservation	Verifying compliance with Section 106 of the National Historic Preservation Act
State Lands Commission	Verifying consistency with the management of lands managed by the commission; possibly issuing a State Lands lease
Native American Heritage Commission	Identifying sacred sites and most likely descendants for Native American burials; providing Native American contact information
State Water Resources Control Board, Regional Water Quality Control Boards	National Pollutant Discharge Elimination System permitting under Section 402 of the Clean Water Act; issuing certification under Section 401 of the Clean Water Act; issuing water right permits

Table 1-1. Agency Roles and Responsibilities (contd.)

Agency	Role/Responsibility
Shasta County	Verifying compliance with the State's Surface Mining and Reclamation Act; issuing other possible construction authorizations/ encroachment permits
Tehama County	Verifying compliance with the State's Surface Mining and Reclamation Act; issuing other possible construction authorizations/ encroachment permits
Local	
Shasta County Air Quality Management District	Reviewing effects on air quality and authority to construct/permit to operate
Resource Conservation Districts	Verifying consistency with protected agricultural lands in the primary and extended study areas

Key:
EIS = environmental impact statement
NEPA = National Environmental Policy Act
SLWRI = Shasta Lake Water Resources Investigation
State = State of California

1.6 Areas of Controversy/Issues to Be Resolved

Several areas of controversy and issues to be resolved have been identified in the SLWRI to date.

1.6.1 Areas of Controversy

Federal, State, and local stakeholders identified several areas of controversy during the SLWRI scoping process and SLWRI agency meetings and workshops. Major concerns are listed below:

- **Impacts on Cultural Resources** — Sites of cultural and religious significance exist in and around Shasta Lake, including sites related to historical activities of Native Americans. The Winnemem Wintu have raised concerns about inundation effects on sites they value for historical and cultural significance that would result from enlarging Shasta Lake through a dam raise.

- **Impacts on Recreation** — Shasta Lake is the principal recreation destination in Shasta County, which realizes annually well over $160 million related to outdoor recreation. Shasta Lake has attracted development of 11 private marinas with 1,075 houseboats and 18 public campgrounds. Stakeholders are concerned about possible adverse effects on recreation at Shasta Lake, such as impacts on concessionaires and their facilities and potential impacts on the regional economy.

- **Impacts on McCloud River's Free-Flowing Condition or Wild Trout Fishery** — No formally designated components of the National or State wild and scenic rivers programs are present in the primary

study area. However, although the McCloud River is not formally designated, Section 5093.542 of the California Public Resources Code specifies that the McCloud River should be maintained in its free-flowing condition, and its wild trout fishery protected from 0.25 miles below McCloud Dam downstream to the McCloud River Bridge. Section 5093.542 was established through enactment of the Wild and Scenic Rivers Act, as amended (Sections 5093.50 – 5093.70). Up to about 3,500 feet of the lower McCloud River above the McCloud River Bridge and within the special designation would be occasionally inundated if Shasta Dam were modified. DWR and other State agencies, landowners, and various environmental groups have expressed concerns about potential impacts on McCloud River resources resulting from enlarging Shasta Dam and Lake.

Another area of controversy concerns whether State agencies can participate in projects that could have an adverse effect on the McCloud River's free-flowing conditions or its wild-trout fishery. Section 5093.542(c) of the California Public Resources Code states the following:

> *Except for participation by DWR in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal, state, or local government in the planning or construction of any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery.*

Furthermore, Section 5093.542(d) states the following:

> *All state agencies exercising powers under any other provision of law with respect to the protection and restoration of fishery resources shall continue to exercise those powers in a manner to protect and enhance the fishery [of the protected segments of the McCloud River].*

Participation by various State agencies in planning and potential construction activities associated with modifying Shasta Dam and Reservoir, including related permitting and approval processes, varies by an agency's mandate and PRC Section 5093.542. DFG has taken the position that it must participate in preparing the EIS to comply with Section 5093.542(d). Other State agencies, including DWR and the State Water Resources Control Board, have participated to a limited extent or expressed their intent to participate in the SLWRI. The CALFED Program Plan (CALFED 2000b) concluded that although

Section 5093.542 sought to protect the free-flowing condition of the McCloud River, it also provided for investigations of enlarging Shasta Dam.

- **Impacts on Reservoir-Area Property Owners** — Raising Shasta Dam would affect privately owned real estate. The raise would (1) inundate additional lands around Shasta Lake; (2) affect existing structures, requiring acquisition of private property or relocation of displaced parties; and (3) require replacement of bridges and segments of existing paved and unpaved roads. These potential effects concern property owners around Shasta Lake.

- **Impacts on Environment, Especially Biological Resources** — Raising Shasta Dam or modifying project operations would affect a broad range of environmental resources, some adversely and some beneficially. Concern has been expressed about potential impacts on all of the following:

  - Wildlife habitat, special-status plant and animal species, and State-designated fully protected species at the reservoir rim

  - Fishery habitat on several creeks and streams that flow into Shasta Lake

  - Fishery and riparian habitat resources along the upper Sacramento River below Shasta Dam

  - Delta smelt and other sensitive aquatic species in the Delta

  - Delta water quality and South Delta water levels

  - Central Valley hydrology below CVP and SWP facilities, and resulting effects on water supplies for water contractors and other water users.

- **Reservoir Reoperation** — Residents and businesses around Shasta Lake have expressed interest in revising the operation of Shasta Dam to reduce the potential for extreme seasonal drawdown for flood control, such as occurred in early 2004. The flood control diagram has not been changed since July 1977 (USACE 1997), and new and evolving technology could reduce Shasta Lake water surface fluctuations associated with drawdown operations for flood control.

1.6.2 Issues to Be Resolved

Issues to be resolved for the SLWRI are described below.

Native American Concerns and Cultural Resources

This PDEIS and accompanying Draft Feasibility Report are consistent with the National Historic Preservation Act Section 106, and describe supporting analyses, studies, coordination, impacts, and mitigation, as necessary. Reclamation has invited Federally recognized tribes and non-Federally recognized tribal groups to be consulting parties to the SLWRI. Although no Federally recognized tribes reside in the immediate Shasta Lake area, members of the Winnemem band of the Wintu Indians have raised concerns about potential impacts of enlarging Shasta Dam on sites they value for historical and cultural significance. Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians is a cooperating agency for the SLWRI, pursuant to NEPA. The Winnemem Wintu will continue to have the opportunity to participate, and are anticipated to continue to provide input, through the Section 106 process as an invited consulting party, as well as through the NEPA process.

Impacts on Biological Resources

The physical environment and associated landscapes within and adjacent to the primary study area provide for a wide array of habitat used by a diverse assemblage of wildlife with varying habitat needs and home ranges. To date, species-specific survey efforts as part of the SLWRI have only included focused investigations for a number of special-status species in the inundation and relocation areas described previously. The scale of these surveys has been limited, and because of a variety of external factors, have not addressed habitat for species with a large home range or at a watershed scale. Therefore, for species that have large home ranges (e.g., Pacific fisher), or that use a wide range of habitats for some aspect of their life history, analyses presented in this document assume presence over a conservatively large geographic area to cover the full range of impacts anticipated for these species.

Off-Site Mitigation for Impacts on Biological Resources

Details about off-site opportunities to mitigate impacts on biological resources in the primary study area are not yet available. Potential mitigation lands containing wetland and special-status species habitat comparable to those that would be affected by the proposed action have been identified near the study area. Additional discussion of how these lands may be applied as mitigation and at what ratios will be provided in future documents. A discussion of mitigation for loss of habitat through preservation and enhancement in mitigation areas will be included in future documents.

Water Rights

Improving the reliability of water supplies is a primary objective of the SLWRI. The potential water supply reliability benefits of the project alternatives are described in Chapter 2. Water rights for the expanded Shasta Reservoir, which

are appropriated by the State Water Resources Control Board, must be in place before the project can operate. Evaluation of water rights will remain a focus of the SLWRI.

Coordinated CVP and SWP Operational Conditions

Planning assumptions and information on water operations used to develop comprehensive alternatives for the SLWRI were developed in 2006, and reflect the coordinated CVP and SWP operations described in the 2004 *Long-Term CVP Operations Criteria and Plan* (2004 OCAP) (Reclamation). In addition, the model package used to evaluate potential effects of the alternatives included in this PDEIS was based on operations described in the 2004 *Long-Term CVP and SWP OCAP Biological Assessment* (2004 OCAP BA) (Reclamation).

Reclamation consulted with the National Oceanic and Atmospheric Administration NMFS and U.S. Fish and Wildlife Service (USFWS) on the 2004 OCAP, and the two agencies issued the 2004 *Biological Opinion on the Long-Term CVP and SWP OCAP* (2004 NMFS BO) and 2005 *Reinitiation of Formal and Early Section 7 ESA Consultation on the Coordinated Operations of the CVP and SWP and the OCAP to Address Potential Critical Habitat Issues* (2005 USFWS BO), respectively. In 2007, the District Court for the Eastern District of California (District Court), in *Natural Resources Defense Council v. Kempthorne*, found the 2005 USFWS BO to be unlawful and inadequate. In May 2008, in *Pacific Coast Federation of Fishermen's Associations v. Gutierrez*, the District Court found the 2004 NMFS BO to be unlawful and inadequate. The District Court remanded both BOs to the fishery agencies.

In August 2008, Reclamation reinitiated consultation with the fishery agencies based on the 2008 *Biological Assessment on the Continued Long-Term Operations of the CVP and SWP* (Reclamation 2008b). USFWS issued the *Formal ESA Consultation on the Proposed Coordinated Operations of the CVP and SWP* in December 2008 (2008 USFWS BO), finding that the long-term operations of the CVP and SWP, as described in the 2004 OCAP BA, would jeopardize the continued existence of the delta smelt. In June 2009, NMFS issued the *BO and Conference Opinion on the Long-Term Operations of the CVP and SWP* (2009 NMFS BO), finding that the same operations would jeopardize populations of listed salmonids, steelhead, green sturgeon, and orcas. Because both agencies made jeopardy determinations, both agencies included a Reasonable and Prudent Alternative (RPA) in their respective BOs.

Several lawsuits were filed challenging the validity of the 2008 USFWS BO and 2009 NMFS BO and Reclamation's acceptance of the RPA included with each BO (*Consolidated Salmonid Cases, Delta Smelt Consolidated Cases*). On November 13, 2009, and March 5, 2010, the District Court concluded that Reclamation had violated NEPA by failing to perform any NEPA analysis before provisionally adopting the 2008 USFWS RPA and 2009 NMFS RPA. On December 14, 2010, the District Court found the 2008 USFWS BO to be unlawful and remanded the BO to USFWS. The District Court issued a similar

ruling for the 2009 NMFS BO on September 20, 2011. On May 4, 2011, in the *Delta Smelt Consolidated Cases*, the District Court ordered USFWS to prepare a draft BO by October 1, 2011, which was subsequently extended to an unspecified date to be agreed upon by involved parties. Reclamation and USFWS must prepare a final BO and final NEPA document by November 1, 2013, and December 1, 2013, respectively.

Reclamation and DWR use CalSim-II to study operations, benefits, and effects of new facilities and operational parameters for the CVP and SWP. A set of operational assumptions was developed in 2006 based on water operations described in the 2004 OCAP BA and the Coordinated Operations Agreement between Reclamation and DWR for the CVP and SWP, as ratified by Congress. These assumptions were used to guide development, modeling, and evaluation of potential effects of the No-Action Alternative and action alternatives included in this PDEIS. Rationale for the decision to use these existing evaluations as the basis of analysis in the PDEIS and accompanying Draft Feasibility Report is provided in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences." Modeling studies and associated analyses will be updated and included in the Draft EIS and other future SLWRI documents.

1.7 Documents Used to Prepare Preliminary Draft EIS

1.7.1 CVPIA EIS

The CVPIA is a Federal statute enacted in 1992 with the following purposes:

> *To protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California; to address impacts of the CVP on fish, wildlife and associated habitats; to improve the operational flexibility of the CVP; to increase water-related benefits provided by the CVP to the state of California through expanded use of voluntary water transfers and improved water conservation; to contribute to the state of California's interim and long-term efforts to protect the Bay-Delta; and to achieve a reasonable balance among competing demands for use of CVP water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors.*

A programmatic EIS was prepared by Reclamation and USFWS in October 1999 to address the potential impacts of implementing the CVPIA. Although not tiering from that document, this SLWRI PDEIS uses information contained in the CVPIA EIS, updated to reflect current and project-specific conditions.

1.7.2 CALFED EIS/EIR

CALFED is a collaboration of 25 Federal and State agencies with regulatory and management responsibilities in the Bay-Delta to develop and implement a long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta system. The objective of the collaborative planning process is to identify comprehensive solutions to the problems of ecosystem quality, water delivery reliability, water quality, and Delta levee integrity.

In July 2000, the CALFED agencies released the *Final Programmatic EIS/Environmental Impact Report* (EIR) (CALFED 2000b), which analyzed a range of alternatives to solve Bay-Delta system problems. In August 2000, the CALFED agencies issued a programmatic ROD that identified 12 action plans. Specifically, plans were identified for the Governance, Ecosystem Restoration, Watersheds, Water Supply Reliability, Storage, Conveyance, Environmental Water Account, Water Use Efficiency, Water Quality, Water Transfer, Levees, and Science programs (CALFED 2000a). The CALFED agencies then began implementing Stage 1 of the ROD, including the first 7 years of a 30-year program to establish a foundation for long-term actions. The SLWRI and associated EIS would be consistent with the CALFED *Programmatic EIS/EIR*, but the SLWRI EIS does not tier from that EIS/EIR.

1.8 Organization of Preliminary Draft EIS

Chapter 1, "Introduction," summarizes the purpose, need, objectives, authorization, and location of the proposed action; provides an overview of the environmental review process and background for the project; summarizes intended use of the FEIS and areas of controversy and issues to be resolved; and discusses documents used to prepare this PDEIS.

Chapter 2, "Alternatives," summarizes the methods used for selecting project alternatives, describes the project alternatives, discusses alternatives that have been eliminated from further discussion, and presents the likely preferred alternative and rationale for selection.

Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," describes the approach to describing the affected environment and environmental consequences, defines impact levels, and describes the methodology for cumulative effects, including cumulative projects. This chapter also presents the regulatory framework for the resources chapters that follow.

Chapters 4 – 25 describe the existing environmental and resource-specific regulatory frameworks for each resource area analyzed in this PDEIS, in the following order:

- Geology, geomorphology, minerals, and soils
- Air quality and climate
- Hydrology, hydraulics, and water management
- Water quality
- Noise and vibration
- Hazards and hazardous materials and waste
- Agriculture and important farmland
- Fisheries and aquatic ecosystems
- Botanical resources and wetlands
- Wildlife resources
- Cultural resources
- Indian Trust Assets
- Socioeconomics, population, and housing
- Land use and planning
- Recreation and public access
- Aesthetics and visual resources
- Transportation and traffic
- Utilities and service systems
- Public services
- Power and energy
- Environmental justice
- Wild and scenic river considerations for McCloud River

Each resource chapter listed above also describes project-level impacts of the No-Action Alternative and action alternatives on the resource or issue area, mitigation measures for those impacts, and cumulative effects of all of the alternatives.

Chapter 26, "Other Required Disclosures," describes any significant adverse effects of the proposed project that cannot be avoided, irreversible and irretrievable commitments of resources, growth-inducing effects, and compliance with applicable laws.

Chapter 27, "Public Involvement, Consultation, and Coordination," describes the public scoping process, agencies and organizations consulted, and areas of controversy, and identifies issues to be resolved.

Chapter 28, "References," lists the sources of information used to prepare this PDEIS.

Chapter 29, "DEIS Distribution List," lists the elected officials; government departments; Federal, State, and local agencies; and special-interest groups that received notice of the availability of this PDEIS.

Chapter 30, "List of EIS Preparers," lists individuals who participated in preparation of this PDEIS, and provides qualifications for those individuals, in order of organization and agency.

Chapter 31, "Index," lists important terms and topics and gives page numbers of relevant discussions.

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